

Figure 1 consists of 12 subplots, labeled (a) through (l), each showing a time course of a different physiological parameter over a 10-minute period. The x-axis for all plots represents time in minutes, from 0 to 10. The y-axis represents the value of the parameter. Each plot shows a baseline value (indicated by a horizontal line) and a response to a stimulus (indicated by a vertical line at approximately 5 minutes). Error bars represent the standard error.

- (a) HR (b/min): Baseline ~70, response ~80.
- (b) SV (ml): Baseline ~100, response ~120.
- (c) CO (l/min): Baseline ~5.0, response ~6.0.
- (d) MAP (mmHg): Baseline ~90, response ~95.
- (e) PVR (mmHg): Baseline ~1.0, response ~1.5.
- (f) SVR (mmHg): Baseline ~1.0, response ~1.5.
- (g) PPA (mmHg): Baseline ~1.0, response ~1.5.
- (h) PVP (mmHg): Baseline ~1.0, response ~1.5.
- (i) PVP/PPA: Baseline ~1.0, response ~1.5.
- (j) PVP/PPA: Baseline ~1.0, response ~1.5.
- (k) PVP/PPA: Baseline ~1.0, response ~1.5.
- (l) PVP/PPA: Baseline ~1.0, response ~1.5.

a conductive tip adapted to receive the radio frequency energy from the hand piece, the conductive tip comprising, on at least a portion of the tip, a multi-character material.

3. An electrosurgical instrument as recited in claim 2, wherein the coating further includes an etching agent.

5. An electrosurgical instrument as recited in claim 4, wherein the base material includes one or more pores therein and the multi-character material occupies at least a portion of the pores.

6. An electrosurgical instrument as recited in claim 1, wherein the multi-character material comprises an amphophilic material with molecular chains having a hydrophilic characteristic, which comprises a water-soluble polymer, and a hydrophobic characteristic.

7. An electrosurgical instrument as recited in claim 2, wherein the base material comprises at least one of:

- (i) a fluoropolymer;
- (ii) a silicone;
- (iii) a ceramic;
- (iv) an aromatic hydrocarbon;
- (v) an aromatic fluorocarbon; or
- (vi) a porous metal.

8. An electrosurgical instrument as recited in claim 7, wherein the water-soluble polymer comprises at least one of:

- (i) polyethylene oxide;
- (ii) polyethylene glycol; or
- (iii) a copolymer of ethylene oxide.

9. An electrosurgical instrument as recited in claim 7, wherein the water-soluble polymer comprises at least one of a water soluble hetero atom polymer, a water soluble acrylate polymer, a water soluble acrylic acid polymer, a water soluble vinyl polymer, and a water soluble natural polymer.

10. An electrosurgical instrument as recited in claim 7, wherein the coating further includes a radical scavenger to reduce damage to the coating during a process of gamma sterilization.

11. An electrosurgical instrument as recited in claim 7, wherein the hydrophobic characteristic comprises at least one of:

- (i) polypropylene oxide;
- (ii) a fluorocarbon; or
- (iii) a hydrocarbon.

12. An electrosurgical instrument as recited in claim 7, wherein the water-soluble polymer is a carrier that provides a factor on a contact area of a patient's body during the electrosurgical procedure.

13. An electrosurgical instrument as recited in claim 12, wherein the factor includes at least one of:

- (i) an antibiotic factor;
- (ii) a healing factor;
- (iii) an anti-adhesion factor;
- (iv) an anti-tumor factor;
- (v) a tumor necrosis factor; or
- (vi) a clotting factor.

14. An electrosurgical instrument as recited in claim 7, wherein the water-soluble polymer provides a low shear, sacrificial layer to the tip.

15. An electrosurgical instrument as recited in claim 1, wherein the tip includes a porous metal.

16. An electrosurgical instrument as recited in claim 1, wherein the multi-character material includes a charged unit.

17. A tip adapted for use in performing an electrosurgical procedure, the tip comprising:

a prepared surface; and

a coating applied to at least a portion of the prepared surface, wherein the coating includes a multi-character material.

18. A tip as recited in claim 17, wherein the prepared surface is a substrate that comprises a porous metal.

19. A tip as recited in claim 17, wherein the prepared surface is a substrate that comprises a roughened metal.

20. A tip as recited in claim 17, wherein the prepared surface is a substrate that comprises surgical stainless steel.

21. A tip as recited in claim 17, wherein the multi-character material includes an amphophilic material with molecular chains having a hydrophilic characteristic and a hydrophobic characteristic, and wherein the hydrophilic characteristic comprises at least one of:

- (i) polyethylene oxide;
- (ii) polyethylene glycol; or
- (iii) a copolymer of ethylene oxide.

22. A tip as recited in claim 17, wherein the coating further comprises a base material.

23. A tip as recited in claim 22, wherein the base material comprises a fluoropolymer.

24. A tip as recited in claim 22, wherein the multi-character material comprises a radical scavenger that reduces damage to the coating during a process of gamma sterilization.

25. A tip as recited in claim 17, wherein the multi-character material provides a low shear, sacrificial layer.

26. A tip as recited in claim 17, wherein the multi-character material comprises a charged unit.

27. A tip as recited in claim 17, wherein the multi-character material comprises a carrier that provides a factor to the contact area of a patient during an electrosurgical procedure.

28. A tip as recited in claim 27, wherein the factor comprises at least one of:

- (i) an antibiotic factor;
- (ii) a healing factor;
- (iii) an anti-adhesion factor;
- (iv) an anti-tumor factor;
- (v) a tumor necrosis factor; or
- (vi) a clotting factor.

29. A method for coating a tip of an electrosurgical instrument, the method comprising the acts of:

preparing a surface of an electrosurgical tip to be coated; and

applying a multi-character material coating layer on the surface.

30. A method as recited in claim 29, wherein the surface is first coated with a base material coating layer.

31. A method as recited in claim 30, wherein the base material coating layer comprises one or more pores, and wherein the multi-character material coating layer occupies at least a portion of the pores.

32. A method as recited in claim 31, wherein the act of applying a multi-character material comprises the act of using a process of electrophoresis to draw the multi-character material into at least a portion of the pores, wherein the combination of the multi-character material and the base material form a first layer about at least a portion of the tip.

33. A method as recited in claim 32, wherein the multi-character material comprises a charged unit.

34. A method as recited in claim 32, wherein the base material comprises a fluoropolymer.



35. A method as recited in claim 34, further comprising the act of applying a coating layer onto the first layer, wherein the coating layer includes a hydrophilic material.

36. A method as recited in claim 29, wherein the act of applying a multi-character material includes utilizing an application process that comprises at least one of:

- (i) a dip process;
- (ii) a spray process
- (iii) a brushing process;
- (iv) a wiping process; or
- (v) an adsorption process.

37. A method as recited in claim 36, wherein the multi-character material comprises a multi-character with molecular chains having a hydrophobic characteristic and a hydrophilic characteristic, and wherein the hydrophilic characteristic comprises at least one of:

- (i) polyethylene oxide;
- (ii) polyethylene glycol; or
- (iii) a copolymer of ethylene oxide.

38. A method as recited in claim 37, wherein the hydrophobic characteristic comprises at least one of:

- (i) polypropylene oxide;
- (ii) a fluorocarbon; or
- (iii) a hydrocarbon